

CLAIMS:

What is claimed is:

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1. A job management apparatus for use in a batch job execution system
5 including a plurality of service providers in communication with the job
management apparatus, the apparatus comprising:
a client communications part which receives a batch job from a client;
an extracting part which extracts a task from the batch job; and,
an assigning part which receives a first signal from at least one of the
10 plurality of service providers, and in response to the first signal delegates the task to
one of the plurality of service providers for performing the task.
2. The job management apparatus of claim 1, wherein the plurality of
service providers are operating on a plurality of machines.
- 15 3. The job management apparatus of claim 1, wherein the first signal
informs the assigning part of the service providers ability to execute a task.
4. The job management apparatus of claim 1, further comprising at
20 least one contact part which receives a second signal from the service providers,
which updates the status of the task being performed by the service provider.

5. The job management apparatus of claim 4, wherein the first signal specifies a minimum frequency at which the second signal will be sent to the contact part.

5 6. The job management apparatus of claim 4, wherein the second signal informs the contact part of completion of the task.

7. The job management apparatus of claim 1, further being in communication with a job database which stores the batch job upon receipt from the client; and

the job database being regularly updated as jobs are executed by batch job execution system.

8. The job management apparatus of claim 7, further comprising a retrieving part which retrieves the batch job from the job database when the batch job is to be executed.

9. A batch job execution system for communicating with at least one client, comprising:

20 a job management apparatus in communication with the clients which receives a batch job from a client, extracts a task from the batch job, and assigns the task;

a job database in communication with the job management apparatus which stores the batch job;

a plurality of service providers in communication with the job management apparatus which receive the assigned task, perform the task, and return a result to the job management apparatus; and,

at least one provider manager in communication with the job management apparatus and in communication with the plurality of service providers which monitors the tasks being performed on the service providers and provides status information to the job management apparatus.

10. The batch job execution system of claim 9, wherein the provider manager in response to a request from the job management apparatus assigns additional service providers to receive tasks from the job management apparatus.

11. The batch job execution system of claim 9, wherein if the service provider fails to complete the task within a predetermined time, the provider manager communicates with the service provider, and informs the job management apparatus of the task status in response to the communication with the service provider.

12. The batch job execution system of claim 9, wherein the provider manager informs the service provider performing the task to terminate performance

of the task in response to a signal received from said job management apparatus.

13. A system for executing a batch job including a plurality of tasks, the system comprising:

5 a first service provider configured to send a first signal for requesting work;
a second service provider configured to send a second signal for requesting work; and,

a job management apparatus including an assigning part and a contact part in communication with the first and second service providers, the assigning part
10 configured to delegate one of the tasks to one of the first and second service providers responsive to receiving the first and second signals from the service providers.

14. The system of claim 13, further comprising a provider manager
15 associated with the first service provider, the provider manager in communication with the job management apparatus and configured to send control signals between the first service provider and the job management apparatus.

15. The system of claim 14, wherein the provider manager is further
20 associated with the second service provider and configured to send control signals between the second service provider and the job management apparatus.

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5 17. A method for preparing and executing a batch job by a batch job
execution system, comprising the steps of:

- submitting a batch job with processing parameters to a job management
apparatus;
- storing the batch job in a job database;
- 10 receiving a first signal from at least one of a plurality of service providers
which informs the job management apparatus of the service providers ability to
perform a task;
- determining whether the batch job execution system is able to process the
batch job;
- 15 extracting at least one task from the batch job;
- delegating the task to the service providers in response to the first signal;
- performing the task delegated to the service provider;
- completing the task; and,
- returning a result from the service provider to the job management
20 apparatus.

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batch job from the batch job database prior to the step of extracting at least one task.

19. The method of claim 17, wherein the step of delegating further
5 comprises delegating a plurality of tasks to the plurality of service providers to be performed in parallel.

20. The method of claim 17, wherein the step of performing, further
10 includes receiving a second signal from the service provider performing the task which updates the status of the task being performed.

21. The method of claim 17, wherein the step of determining further
includes assigning additional service providers to perform tasks for the job
management apparatus if it is determined that the batch job execution system is
unable to process the job.

15 22. The method of claim 17, further comprising the steps of:
communicating with the service provider performing the task after a
predetermined time;
informing the job management apparatus of the tasks status; and,
20 the job management apparatus determining whether to re-assign the task or
wait for task completion in response to the step of updating the task status.

23. The method of claim 17, further comprising the step of terminating the step of performing the task in response to receiving a signal from the job management apparatus, prior to the step of completing the task..

5 24. An article of manufacture including an information storage medium wherein is stored information comprising;

a client communications software component which receives a batch job from a client;

an extracting software component which extracts a task from the batch job;

10 and,

an assigning software component which receives a first signal from at least one of a plurality of service providers, and in response to the first signal delegates a task to one of the plurality of service providers for performing the task.

15 25. The article of manufacture of claim 24, wherein the assigning software component monitors which service providers are able to perform a task.

20 26. The article of manufacture of claim 24, further comprising a contact software component which receives a second signal from the plurality of service providers which informs the contact software component of the status of the task being performed.

1. *What is the purpose of the study?*
 2. *What are the research questions or hypotheses?*
 3. *What is the study design?*
 4. *What are the participants and sample size?*
 5. *What are the variables and measurement tools?*
 6. *What are the data analysis methods?*
 7. *What are the results and conclusions?*
 8. *What are the limitations and future research directions?*

10 29. The article of manufacture of claim 28, further comprising a
retrieving software component which retrieves the batch job from the job database
software component when the batch job is to be executed.

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